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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,956	08/28/2003	Fang F. Dong	12812.14373	1955

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EXAMINER	
THOMAS, COURTNEY D	
ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 02/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,956	DONG ET AL.	
	Examiner	Art Unit	
	Courtney Thomas	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/28/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-32 are objected to because of the following informalities: (For brevity, only independent claim 1 and its corresponding dependent claims 2-12 are discussed. The informalities can be similarly found in remaining claims 13-32)

2. Claim 1, line 3 recites: "...monitoring the generator..." Examiner suggests the phrase be re-written as: "...monitoring ~~the~~ **a** generator..."

3. Claim 5, line 2 recites: "...determining the number of corrupted views..." Examiner suggests the phrase be re-written as: "...determining ~~the~~ **a** number of corrupted views ..."

4. Claim 6, lines 2-3 recite: "...providing a warning to the operator if the actual number of corrupted views exceeds the maximum allowable ..." Examiner suggests the phrase be re-written as: "...providing a warning to ~~the~~ **an** operator if the ~~actual~~ number of corrupted views exceeds ~~the~~ **a** maximum allowable ..."

5. Claim 7, line 2 recites: "...storing the history ..." Examiner suggests the phrase be re-written as: "...storing ~~the~~ a history ..."

6. Claim 8, lines 2-3 recite: "...the need to change the X-ray tube." Examiner suggests the phrase be re-written as: "...~~the~~ **a** need to change the ~~X-ray tube~~ **generator**."

7. Claim 9, line 2-3 recites: "...interpolation between the two most recent good images..." Examiner suggests the phrase be re-written as: "...interpolation between ~~the~~ two most recent good images ..."

8. Claim 26 is dependent on independent claim 25. Examiner notes that claim 26 does not appear to further limit independent claim 25. In particular, Examiner concludes that there is no

discernable difference between a maximum number of views (claim 25, line10) versus a maximum allowable number of views (claim 26).

9. The claims have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the claims.

10. Appropriate correction is required.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

12. Claims 1 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsieh et al. (U.S. Patent 6,466,645).

13.

After selected steps of preprocessing, tube-spit detection is performed **106** on the sample. Such detection can be performed using many different methods, and one specific method is described below in more detail. Generally, the objective is to determine whether the x-ray source experienced a drop in power. Specifically, upon the occurrence of a tube-spit event, signals on the entire detector should experience a significant drop since the x-ray tube output is reduced to nearly zero. Therefore, a tube-spit condition can be detected by determining whether the x-ray tube output was reduced to nearly zero for a period of time.

14.

FIG. **3** is a flow chart illustrating tube-spit detection and correction processing **100** in accordance with one embodiment of the present invention. Such detection and correction are performed, for example, by a processor in DAS **32**, image reconstructor **34**, or computer **36**. Rather than increas-

(Top) Column 3, lines 29-39 (Bottom) Column 3, lines 10-14; U.S. Patent 6,466,645

15. **As per claims 1 and 13**, Hsieh et al. disclose a method (and processor) for detecting and correcting tube-spit events comprising the steps of monitoring a generator output from a CT system generator; determining whether a tube spit event occurred; and if a tube spit occurred, performing tube spit correction (see Abstract (not shown above); column 3, lines 12-14; 29-39; column 3, lines 48-54 (not shown above)). Examiner notes that the method for detecting tube-spit events also comprises the step of providing an X-ray controller (28) and computer (36).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 2-12 and 14-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh et al. (U.S. Patent 6,466,645).

18.

> FIG. **4** is a flow chart illustrating an exemplary method for tube-spit detection processing **120**. As explained above, many alternative methods can be used for such detection, including by measuring the current or voltage of the power supply to the x-ray tube. Sudden changes in either such current or voltage measurement is an indication of a tube-spit event. 50

Column 3, lines 48-54 - U.S. Patent 6,466,645 to Hsieh et al.

19. **As per claims 2-4 and 14-16**, Hsieh et al. disclose a method (and processor) as recited in claims 1 and 13, but do not explicitly disclose a method comprising the step of monitoring either generator kV or mA waveforms; determining whether generator output dropped below a threshold value and if generator output falls below the threshold, declaring a tube-spit event.

20. Hsieh et al. teach the existence of alternate methods for detecting the occurrence of tube-spit events. In particular, Hsieh et al. teach that tube-spit events are often accompanied with sudden output changes, such as tube current or voltage. It would be appreciated by those having ordinary skill in the X-ray tube art that sudden changes represent data outside of normal operating parameters (threshold) – (column 3, lines 48-54 (above); see also column 3, lines 29-39).

21. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method (and processor) of Hsieh et al. such that the steps of detecting and correcting tub-spit events comprise: monitoring either generator kV or mA waveforms; determining whether generator output dropped below a threshold value and if

generator output falls below the threshold, declaring a tube-spit event. One would have been motivated to make such a modification for the purpose of identifying anomalous tube-operating parameters (i.e. voltage or current) to correlate the occurrence of a tube spit event as suggested by Hsieh et al. (column 3, lines 48-54 (above); see also column 3, lines 29-39).

22. **As per claims 5-12**, Hsieh et al. as modified above, disclose a method (and processor) for detecting and correcting tube-spit events comprising the steps of determining corrupted views (144) storing history and magnitude of tube spit occurrences (Figs. 3 and 4), notifying operator of need to change generator (column 4, lines 45-51) and using interpolation between two good views to replace corrupted views (column 4, lines 52-67); wherein view interpolation is performed in accordance with $P_{ij}(k+n)=\left(\frac{m-n}{m+1}\right)P_{ij}(k-1)+\left(\frac{n+1}{m+1}\right)P_{ij}(k+m)\ \ 0\le n<m$ (column 4, line 65).

23. **As per claims 17-32**, Hsieh et al. as modified above, disclose a method (and processor) for detecting and correcting tube-spit events comprising the steps of determining corrupted views (144) storing history and magnitude of tube spit occurrences (Figs. 3 and 4), notifying operator of need to change generator (column 4, lines 45-51) and using interpolation between two good views to replace corrupted views (column 4, lines 52-67); wherein view interpolation is performed in accordance with $P_{ij}(k+n)=\left(\frac{m-n}{m+1}\right)P_{ij}(k-1)+\left(\frac{n+1}{m+1}\right)P_{ij}(k+m)\ \ 0\le n<m$ (column 4, line 65).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (571) 272-2496. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Courtney Thomas

Courtney Thomas
Examiner
Art Unit 2882